S O F T W A R E   R E V I E W:

NEW HARD/SOFTWARE COMBOS PRODUCE DYNAMITE COLOR-B/W GRAPHICS

By Norm Lehfeldt

High-resolution black-and-white or color screen dumps for both the Timex/Sinclair 2068/Spectrum and the Sinclair QL are implemented with two new software packages.

For the QL, Don Thompson of Martinez, CA has produced a monochrome dump utility for the Olivetti PR 2300, ink-jet printer and a full-color dump for the color ink-jet printer built by Canon and marketed also with Radio Shack and IBM name plates.

The monochrome utility reproduces the colors from the QL screen as a series of different stipples so that there is pleasing contrast between adjacent areas of different colors. The color dump reproduces the colors on the QL screen with remarkable accuracy, given the differences between color phosophors and color inks.

Both of Don's programs reproduce the screen either as a one-page, full-size horizontal dump or in 'zoom' mode which magnifies any selected portion of the screen by two diameters. Using this feature it is possible to copy the whole screen on two strips of paper which can then be taped together for a poster-sized print-out! Both programs offer positive or negative image print-outs. In the color program only black and white are swapped in the negative mode. This feature is especially useful in printing 'Easel' graphs, since you don't waste a lot of ink reproducing the black of the monitor screen. Both utilities also feature well-thought-out SuperBASIC loader programs which let you select the various options from attractively designed menu screens.

Don's programs are marketed by Curry Computer.

For the 2068, Dave Franson has created and is marketing a set of color screen dumps that reproduce that computer's color displays on the same Canon-Radio Shack-IBM color ink-jet printer.

The fully-relocatable machine-code routines (and their BASIC loading-relocating programs) are provided on opposite sides of a single cassette and produce either a 2 1/4" X 3" or a 4.5" X 6" color screen dump. It should be possible to load both drivers at once and switch back and forth between image sizes by appropriate USR calls. (I believe it is also possible to load them along with Jack Dohaney's relocatable AERCO I/F driver and thus have your program switch easily between text and graphics printing.)

Supplying the two drivers separately greatly enhances the flexibility you will have in incorporating them into your own programs. Only the AERCO printer interface is supported by the drivers.

Where to buy them:

Don Thompson's screen dump programs for the QL and the Olivetti PR 2300 monochrome or Canon-Radio Shack-IBM color printers are available from:

> Curry Computer
> P.O. Box 5607
> Glendale, AZ 85312-5607
> (602) 978-2902

Dave Franson's color dumps for the 2068/Spectrum are $10.00 from:

> Dave Franson
> 3534 E. Squire Ave., A
> Cudahy, WI 53110

In the Bay Area the Radio Shack CGP220 color printer has been closed out, but there may be supplies in other areas. At last word, the identical Canon PJ-1080A was being offered for $199.00 plus $12.00 S/H by:

> BCE Liquidators
> 3233 K Street, NW
> Washington, DC 20007
> (800) 545 7447

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*********************************
        Z X - P C
       By  John Ezike
*********************************
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THIS MONTH I HAVE A SHORT PROJECT WHICH
WILL ENABLE YOU TO ADD A SWITCH TO YOUR
TS2040 PRINTER FOR UNDER $3.00! BEFORE YOU
BEGIN PLEASE READ THE DISCLAIMER.

DISCLAIMER

NEITHER THE PUBLISHER OF THIS MAGAZINE NOR
THE AUTHOR IS RESPONSIBLE FOR ANY DAMAGE
THAT MIGHT OCCUR IF YOU ATTEMPT THIS
PROJECT. YOU DO SO AT YOUR OWN RISK. IF
YOU DECIDE TO PROCEED WITH THIS PROJECT,
MAKE SURE THE WARRANTY ON YOUR PRINTER HAS
EXPIRED.

DISCUSSION

THE REASON FOR ADDING A SWITCH IS THAT
EVEN AFTER YOU PRESS THE 'OFF' BUTTON TO
TURN THE PRINTER OFF, POWER IS STILL BEING
SUPPLIED TO THE PRINTER! THE ON/OFF
SWITCHES ONLY CONTROL THE PRINT DRIVER.
LEAVING YOUR PRINTER ON FOR VERY LONG
PERIODS OF TIME COULD CAUSE IT TO OVERHEAT
AND BE DAMAGED. YOU COULD UNPLUG THE POWER
WHEN YOU ARE NOT USING THE PRINTER,
HOWEVER FREQUENT PLUGGING AND UNPLUGGING
CAN WEAR OUT THE PLUG AND JACK. THE IDEA
IS QUITE STRAIGHTFOWARD AND SIMPLY
INVOLVES CUTTING THE TRACE THROUGH WHICH
POWER IS SUPPLIED TO THE PRINTER AND
JUMPERING THE CUT TRACE WITH A SWITCH. A
LED(LIGHT EMITTING DIODE) IS USED TO
INDICATE THAT POWER IS ON. IN MY ARTICLES
ON HARDWARE PROJECTS I WILL USE RADIO
SHACK PART NUMBERS, SINCE IT WILL MAKE
THEM EASIER TO LOCATE.

PARTS LIST

```
1 - SPDT MICROMINI SWITCH (#275-625)
1 - LIGHT EMITTING DIODE (#276-041)
1 - 470 OHM  1/4W  5% (#271-1317)
22 GAUGE HOOK-UP WIRE
```

TOOLS NEEDED

```
30 WATT, GROUNDED SOLDERING IRON
40/60 ROSIN CORE SOLDER
MINI LONG NOSED PLIERS
DESOLDERING BRAID OR TOOL
XACTO OR UTILITY KNIFE
WIRE STRIPPER
```

PREPARATION

YOU CAN GET YOUR PARTS FROM ANY
ELECTRONICS PARTS STORE YOU CHOOSE, JUST
MAKE SURE THAT THE SPECIFICATIONS ARE THE
SAME. CUT TWO 8 INCH LENGTHS OF THE
HOOK-UP WIRE AND REMOVE 1/4 INCH OF
INSULATION FROM ALL FOUR ENDS. CLEAR YOUR
WORK AREA, MAKING ESPECIALLY SURE THAT YOU
HAVE NO SMALL PARTICLES LYING AROUND THAT
COULD ENTER YOUR PRINTER MECHANISM AND
DAMAGE IT. PLUG IN THE PRINTER. REMOVE THE
PAPER FROM YOUR PRINTER BY HOLDING THE
ROLL UP AND CUTTING ACROSS IT WITH A PAIR
OF SCISSORS. PRESS AND HOLD THE 'ON'
SWITCH UNTIL THE PAPER LEFT IN THE PRINTER
COMES OUT. UNPLUG THE PRINTER AND TURN IT
OVER. YOU WILL SEE FOUR SCREWS. REMOVE
THEM AND PLACE THEM ASIDE SAFELY. MAKE

SURE THAT YOU HOLD THE TWO HALVES OF THE
CASE TOGETHER. TURN THE PRINTER THE RIGHT
SIDE UP. CAREFULLY LIFT OFF THE TOP HALF
OF THE CASE AND PLACE IT TO ONE SIDE. YOU
ARE NOW LOOKING AT THE COMPONENT SIDE OF
THE PRINTED CIRCUIT BOARD (PCB). SEE FIG.
1. IN THE TOP RIGHT HAND CORNER YOU WILL
SEE A HEAT SINK AND RIGHT IN FRONT OF YOU
WILL BE THE PRINTER MECHANISM. TWO AMBER
COLORED FLEXIBLE RIBBON CONNECTORS ARE
PLUGGED INTO TWO SOCKETS LABELED J1 AND
J2. CAREFULLY REMOVE EACH CONNECTOR BY
HOLDING THE SIDES AND PULLING UPWARDS. YOU
MAY HAVE TO MOVE IT FROM SIDE TO SIDE
SLIGHTLY, WHILE PULLING. NOW THAT THE
CONNECTORS ARE FREE, REMOVE THE PRINTER
MECHANISM. THERE ARE TWO METAL PLATES ON
EITHER SIDE BENT OUT TO FORM FOUR FLANGES,
WITH RUBBER GROMMETS IN THE CENTER OF EACH
FLANGE. THESE GROMMETS FIT AROUND FOUR
PLASTIC POSTS,(LABELED E, F, G AND H)
WHICH ARE ATTACHED TO THE LOWER HALF OF
THE CASE. HOLD THE PCB DOWN WITH ONE HAND
AND GENTLY LIFT OFF THE SIDE OF THE
MECHANISM WHICH FITS AROUND POSTS G, AND
H. HOLD ONLY THE FLANGES WHILE LIFTING. DO
THE SAME FOR THE OTHER SIDE. DO NOT TOUCH
THE ROLLER OR ANY OTHER PART OF THE
PRINTER SINCE IT IS DELICATE AND COULD BE
DAMAGED. PLACE THE MECHANISM IN THE TOP
COVER ALONG WITH THE SCREWS AND PRINTER
PAPER.

CONSTRUCTION

REMOVE THE PCB FROM THE CASE BY SLIDING A
SMALL SCREWDRIVER BETWEEN THE PCB AND CASE
AND LIFTING. ON THE REAR EDGE OF THE PCB
AND IN THE CENTER IS THE POWER JACK. ABOUT
A 1/4 INCH BELOW IT ARE TWO GROUPS OF
THREE FEEDTHROUGH HOLES IN THE SHAPE OF A
TRIANGLE. LOCATE THE FEEDTHROUGH HOLE IN
THE GROUP ON THE RIGHT LABELED 'C'. ONE
INCH BELOW THIS HOLE IS ANOTHER
FEEDTHROUGH HOLE LABELED 'D'. SEE FIG. 1.
THE DOTTED LINE JOINING POINTS C AND D
REFERS TO THE TRACE CONNECTING THEM ON THE
OTHER SIDE OF THE PCB. THE JAGGED LINES
CROSSING THE TRACE DENOTES THAT THE TRACE
SHOULD BE CUT. IN THE LOWER LEFT HAND
CORNER OF THE PCB IS A FEEDTHROUGH HOLE
LABELED 'B'. TURN THE PCB OVER AND WITH
THE XACTO OR UTILITY KNIFE GENTLY SCRAPE
OFF THE PROTECTIVE COATING TO EXPOSE A 1/4
INCH AREA OF COPPER AROUND 'B'. THIS WILL
BE THE 'GROUND' TO WHICH YOU WILL SOLDER
ONE END OF THE LED.

LOOK AT THE LED. YOU SHOULD SEE A FLAT
SIDE AROUND ITS RIM AND THE SHORTER OF ITS
TWO LEADS SHOULD BE NEXT TO IT. THIS IS
THE CATHODE OR NEGATIVE LEAD. ON SOME
LED'S YOU WILL SEE A NOTCH INSTEAD OF A
FLAT SIDE ABOVE THE CATHODE. FROM THE
COMPONENT SIDE, PUSH THE CATHODE THROUGH
HOLE 'B' AND SOLDER IT TO THE EXPOSED
COPPER AREA. MAKE SURE THE SOLDER
CONNECTION IS SHINY AND SMOOTH. IF IT
ISN'T REMOVE IT WITH THE SOLDER BRAID AND
RESOLDER. DO NOT APPLY TOO MUCH HEAT WHILE
SOLDERING AS THIS COULD DAMAGE YOUR
COMPONENTS. NOW SOLDER THE OTHER LEAD
(ANODE) TO ONE END (IT DOESN'T MATTER
WHICH) OF THE RESISTOR AND SOLDER THE
OTHER END OF THE RESISTOR TO POINT 'A'.
THIS IS THE POSITIVE OR PLUS SIDE FOR THE
LED. THE RESISTOR ACTS AS A CURRENT
LIMITER AND PROTECTS YOUR LED FROM
EXCESSIVE CURRENT. POINT 'A' IS THE LEAD

ON THE DISC CAPACITOR C11, WHICH IS CONNECTED TO THE POSITIVE LEAD ON THE ELECTROLYTIC CAPACITOR, C10. TURN THE PCB OVER TO VERIFY THIS. IF C11 IS PLACED TOO CLOSE TO THE SURFACE OF THE PCB, TURN THE PCB OVER AND SOLDER THE RESISTOR TO THE SOLDER PAD CORRESPONDING TO POINT 'A'. WE ARE NOW GOING TO CONNECT THE SWITCH. FROM THE COMPONENT SIDE, PUSH THE STRIPPED END OF ONE OF THE HOOK-UP WIRES THROUGH HOLE 'C' AND SOLDER IT. NOW, PUSH ONE END OF THE OTHER WIRE THROUGH HOLE 'D' AND SOLDER IT. TURN THE PCB OVER TO THE SOLDER SIDE AND WITH THE UTILITY KNIFE CUT THE TRACE JOINING POINTS 'C' AND 'D'. MAKE SURE THE TRACE IS COMPLETELY CUT. A CUT ABOUT 1/10 INCH WIDE SHOULD BE ENOUGH.

NOW REFER TO FIG. 2. RETRIEVE THE TOP HALF OF THE CASE AND WITH A DRILL OR SOME OTHER SUITABLE DEVICE, DRILL A 1/4 INCH HOLE TO MOUNT THE SWITCH. PLACE THE TWO CASE HALVES TOGETHER AND DRILL ANOTHER HOLE JUST LARGE ENOUGH TO FIT THE LED. DON'T DO YOUR DRILLING AROUND YOUR PRINTER MECHANISM!! MOUNT THE SWITCH IN THE HOLE YOU JUST MADE. IT WILL BE A LITTLE CRAMPED, SO TAKE YOUR TIME. NOW, SOLDER THE FREE END OF THE WIRE CONNECTED TO 'C' TO THE CENTER TERMINAL OF THE SWITCH. SOLDER THE FREE END OF THE WIRE CONNECTED TO 'D' TO EITHER OF THE TWO OUTSIDE TERMINALS ON THE SWITCH. REPLACE THE PCB IN THE LOWER HALF OF THE PRINTER CASE, MAKING SURE TO ALIGN THE NOTCHES ON THE SIDES OF THE PCB WITH THE TABS IN THE CASE. REPLACE THE PRINTER MECHANISM. THE RUBBER GROMMETS IN THE FLANGES SHOULD BE FLUSH WITH THE TOP OF THE SCREW POSTS. PLUG IN THE TWO RIBBON CONNECTORS. PUSH DOWN FIRMLY TO MAKE SURE THEY ARE SNUG. BEND THE LED FOWARD SO THAT IT RESTS ON THE GROOVE IN THE LOWER PART OF THE CASE AND PROTRUDES ABOUT 1/8 INCH OUTSIDE THE CASE. KEEP THE LEADS APART. REPLACE THE TOP COVER. THE LED SHOULD FIT IN THE GROOVE ALREADY MADE. HOLD BOTH HALVES TOGETHER AND REPLACE THE FOUR SCREWS.

TESTING

PLUG IN THE POWER. IF THE LED IS LIT, YOU KNOW THAT THE SWITCH IS IN THE 'ON' POSITION. IF IT ISN'T, TRY THE OTHER POSITION. IF THE LED DOES NOT LIGHT, QUICKLY UNPLUG THE POWER, OPEN UP THE PRINTER AND CHECK YOUR CONNECTIONS ESPECIALLY THE INSTALATION OF THE LED. ALSO LOOK FOR SOLDER BRIDGES AND BAD SOLDER JOINTS. INSERT THE PRINTER PAPER AND PEFORM THE SELF-TEST PROCEDURE AS DESCRIBED IN YOUR PRINTER MANUAL.

CONCLUSION

IF ALL GOES WELL, CONGRATULATIONS!!! WE'LL TURN THIS LITTLE COMPUTER INTO A 'REAL' COMPUTER YET. THIS PROJECT SHOULD ALSO WORK FOR THE ALPHACOM PRINTER. TO USE YOUR PRINTER, PLUG IT IN, SWITCH IT ON, AND PRESS THE 'ON' SWITCH. IF YOU HAVE ANY QUESTIONS, SEND ME A LONG S.A.S.E AND I WILL TRY TO ANSWER IT. SEE YOU NEXT MONTH.

JOHN O. EZIKE
1619 GRANT ST. #5
BERKELEY, CA 94703   *.*

FIG. 1

FIG. 2

HOLE FOR SWITCH

HOLE FOR LED
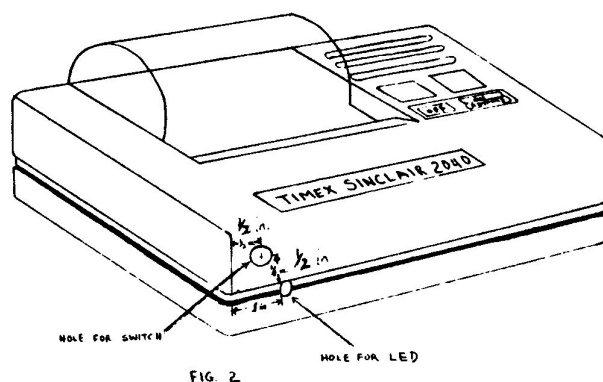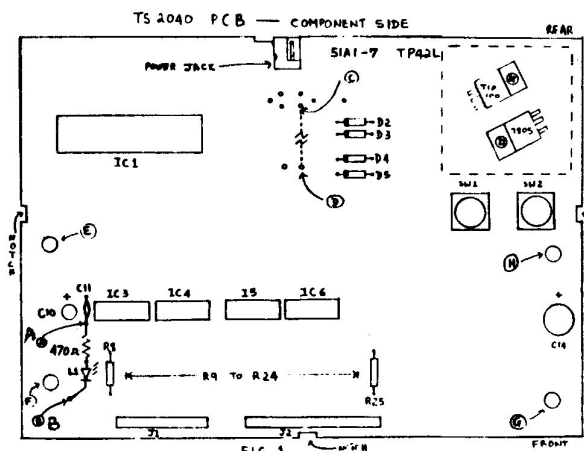
N O T I C E

The November 1986 issue of TIMELINEZ included an article entitled "BASCII" by Terry Greenlee. Two of the BASIC program lines should be revised as follows:

```
30 LET C$="■"
40 LET L$="■"
```

In other words, a black square (an INVERSE VIDEO space) should be included within the quotation marks.

```
10 REM **** TRY THIS ****
20 OVER 0
30 FOR N=65 TO 90
40 PRINT AT 10,15;CHR$ N;
50 PRINT CHR$ 8;
55 REM CHR$ 8 = BACKSPACE
60 PAUSE 25: NEXT N: CLS
```

FROM SEPT. 15-28 TWICE N/L.

Amstrad To Bow New IBM Compatibles From $595

Aiming to set the $34 billion world personal computer market on its ear, Amstrad, the maverick British consumer electronics marketer, has announced plans for the introduction and international sale of an eight-model line of low priced IBM-compatibles.

The new models range from a leader designed to list in England at about $595 to a high-end business oriented version with color monitor and hard disc drive at under $1,500. Alan Sugar, Amstrad's chairman, says the machines are already being turned out in the Far East on a production schedule that calls for a rate of 70,000 monthly, and that he is looking for sales in Europe of 300,000 total units by the end of this year.

A sales start in the U.S. is scheduled for early next year, and Sugar says he should be able to move 50,000 to 60,000 a month here. Production in 1987, he claims, will then jump to 100,000 monthly, and worldwide sales for the year should hit at least 800,000. If Amstrad even comes close to its volume goals, it could put a severe competitive crimp in the marketing plans of the U.S. low end computer leaders Atari and Commodore, while siphoning off a major chunk of business from a host of smaller computer companies marketing low-end IBM clones.

Relatively unknown here, Amstrad has through sharp pricing and marketing tactics established itself as a major video and audio equipment company in the U.K., and one of the biggest players in the Europe-wide computer market, with a 34 percent share. Last spring it acquired Sinclair's computer business, along with consumer electronics brand rights, for $7.5 million. Just now finding its way into stores here is Amstrad's Korean-made packaged $799 personal word processing system that includes a computer, disc drive, software, monitor and printer. It's being distributed under an exclusive agreement by Sears World Trade Corp. Whether Sears will also handle Amstrad's new IBM compatible PCs is uncertain. □

Sinclair is still kicking

To the editor: Your issue of June 23 contains a serious error. It is not true that Amstrad Consumer Electronics plc bought Sinclair Research Ltd. [*Electronics*, June 23, 1986 p. 53]. They simply bought the existing computer range and the right to the use of the brand name. They have no right to any future computer products or any other product categories. A portable computer is under development, but by my team and for my company. We plan to launch it in the first half of 1987.

Sir Clive Sinclair
Chairman
Sinclair Research Ltd.
London

TRUTH TABLE

IN		OUT
A	B	Z
L	L	L
L	H	H
H	L	H
H	H	L

BETTER RGB CIRCUIT
by Joe Williamson

FROM THE JULY 1986 SUM N/L.

The circuit described in the february 1986 issue of SUM was designed around the Sears RGB/TV/Monitor (same as the Sanyo model # 31C426) and the Magnavox (NAP) RGB-40 or 80.

Both of these monitors (and the QL monitor as well) take negative-going composite sync and active high RGB signals and have well buffered inputs to clean up any poor inputs.

Many RGB monitors out on the market don't have these features and therefore do not work very well or at all with the circuit described. With the simple addition of a 74LS86 Quad 2-input Exclusive OR gate, you can shape (buffer) and invert all four signals to what ever format you need by changing the polarity of one of the two input lines on each of the four gates.
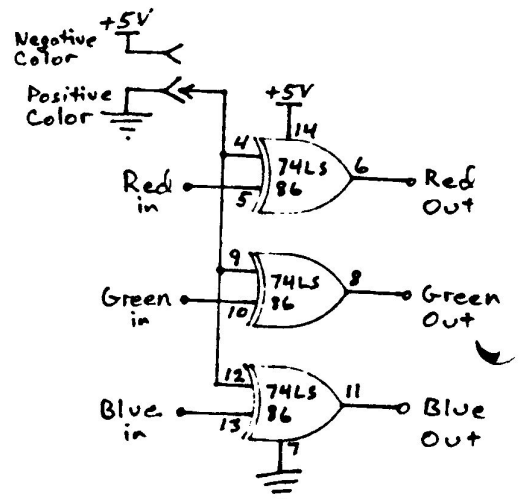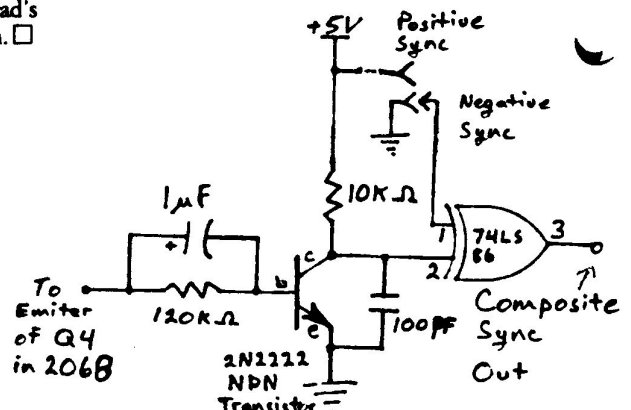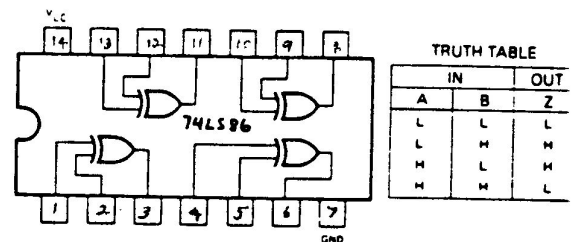
Also, I neglected to say what transistor was used in the original circuit; it is a 2N2222, Radio Shack #276-2009. Although, any garden variety NPN transistor should work.

EDITORS NOTE: Last month, an article by Dave Gray was published which dealt with the transmittal of BASIC programs over a MODEM. The article below, sent to me via MODEM, deals with the transmittal of text files.

MTERM STUFF
by Bill Strick

Now that there is a sizeable group of MODEM owners, perhaps a little advice concerning the use of these marvels will promote a sharpening of interest in their use and an increase in the exchange of useful information between all of us. Following are some hints regarding data transmission via MODEM.

A. TO TRANSMIT (XMIT)

SENDER goes to BUFFER MENU and erases Buffer contents. Back to MAIN MENU, EXITs to BASIC and LOADS or MERGES data to be transmitted. (See Section C for details.)

Phone the person to receive the above data and determine (via voice) that the parameter settings agree as shown below:

SENDER	RECEIVER	BOTH
BUF: CLOSED	BUF: CLOSED (Opened by	XMIT: OFF
DUP: HALF	DUP: FULL XMIT OP)	WORD: 7
LF: ON	LF: OFF	STOP: 1
CR: OFF	CR: OFF	PRTY: EVEN
CON: NONE (text)	CON: NONE (text)	DSPW: 32
:(HEX for other)	:(HEX for other)	

SENDER informs RECEIVER to (1) clear buffer, (2) go to terminal mode, and (3) connect up via MODEM COMMAND M.

To access MODEM COMMANDS, press CAPS SHIFT & ENTER together. ENTER M to connect. SENDER also CONNECTS as described. Both users leave phone receiver off hook. CONNECT will take place with a displayed signal and sound.

From this point, ANY activity is in the hands of SENDER ONLY!!

After CONNECT signal, SENDER opens the RECEIVER's buffer by executing a CONTROL R (CAPS SHIFT & 7 and then enters an R).

SENDER now returns to MAIN/MENU using CAPS SHIFT 8 and calls up BUFFER MENU. ENTERs T to transmit text in buffer.

ENTER four times: #1 after prompt- "Prompt String"
                  #2 after prompt- "Character delay"
                  #3 returns SENDER to MAIN MENU
                  #4 enters TERMINAL MODE

This begins transmission which can be viewed on screen.

After end of transmission, SENDER closes RECEIVER's buffer with a CONTROL T (CAPS SHIFT & 7, then T).

SENDER then enters BELL signal (CONTROL G...CAPS SHIFT & 7, then 6), which signals the end of transmission (XMIT) to RECEIVER.

After BELL, both USERS disconnect by doing a MODEM COMMAND H (CAPS SHIFT & ENTER , then H) to "Hang up" modems. They can now converse freely on their telephones.

NOTE: If "Waiting Caller" service is on SENDER's phone, it will be necessary (before using MODEM) to cancel this service temporarily. This can be done by dialling STAR ("*") 70 for a touchtone phone or 1170 for a pulsetone phone.

B. TO MOVE MTERM BUFFER CONTENTS TO MSCRIPT

To save material from Modem buffer, first note the length of Buffer used (BUFUSD). Then EXIT to BASIC and SAVE.

    To Tape: SAVE "(name)" CODE 26710, (length)
    To AERCO DDS: MOVE "(drive):(name).bin",26710, (length)
    To ZEBRA DDS: SAVE *"(name)" CODE 26710, (length)

LOAD MSCRIPT. LOAD saved material from Home Menu.

C. TO TRANSMIT MSCRIPT FILES OR BIN.COD VIA MTERM

First, move file to MTERM buffer as outlined below:

    * Make a note of document (file) length (from a DIRECTORY
                or CATALOG listing or from a Header Reading).
    * SAVE document to tape or disk.
    * LOAD MTERM. Go to Buffer Menu.
    * Clear buffer.   EXIT to BASIC.
    * Open up program area with DIM A$ (document length).

Since this expands VARS (not the program area):

    POKE 23627, PEEK 23641: POKE 23628, PEEK 23642

Now LOAD from Tape: LOAD "" CODE 26710
          from AERCO DDS: CAT "(drive):(name).bin",26710
          from ZEBRA DDS: LOAD *"(name)" CODE 26710

The command, PRINT USR 54016, will restore MTERM with document fully installed in its Buffer and ready for transmission.

NOTE: Some BBS systems require LF after each line, so you may have to add them before leaving MSCRIPT.

We are two people who still get a great deal of satisfaction out of our humble computers. We've spent many, many hours telecommunicating all over the U.S. to every BBS that we could find which supports our machines. We did not want all this effort and time to be wasted on our own uses alone. So we got together and wrote a small publication called,"The T/S Guide to telecommunication".

This is an entirely FREE publication, no copyrights will apply. We enclose an outline of the document in progress. We intend to send you a copy when it is ready. In the mean time, we wanted you to have the information on the enclosed chart which gives the names, numbers,hours and settings of all the boards that we could find. We would hope that you could see fit to publish this in your User Group Newsletter. Failing that we would hope you might make it available to all your members by xeroxing at the User Group meeting. As I said, we spent many,hours on the phone verifying all this information, and are prepared to say that it's accurate (until it changes). The guide has a much more detailed description of each of these boards, as well as descriptions of all the modems, terminal programs and hardware add-ons that we could find. It should certainly be in your hands by the end of October.

Take it easy, and keep on TIMEXing!

Steve Ishii
18414 Deloise Ave.
Cerritos,CA 90701

Pete Fischer
P.O.Box 2002
Tempe, AZ 85281

Name	Number	Settings	Hours		1	2	3	4	5	6	7	8	9	10	Sys Cap	T/S DL	CP/M DL	Location
AVERAGE REMOTE	(213)325-0213	8,1,N	24Hrs		Y	N	Y	Y	N	1	Y	Y	Y		21 MB	1 MB	MB	Los Angeles, California
BILL'S OBSESSION	(404)377-2550	8,1,N	90%		Y	Y	Y	Y		2	Y	Y	N		22 MB	300 KB	2 MB	Atlanta, Georgia
COMPUSERVE	(Local No.)	7,1,0	24Hrs			N	Y	Y	Y	2	Y	Y	Y				Y	Columbus, Ohio
FWKUG	(817)540-4183	8,1,N	24Hrs		Y	Y	Y	Y	Y	0	Y	Y	N		44 MB	200 KB	25-30 MB	Ft.Worth, Texas
ISTUG	(317)898-3903	7,1,0	24Hrs		N	N	Y	N	N	1		N	N		64K	0	0	Inianapolis Indiana
LOONEY BIN!	(619)390-9470	7,1,0	24Hrs		N	N	Y	N	N	1	N				562 KB	0	0	San Diego, California
MCI MAIL -	(Telenet)	8,1,N	24Hrs			N	Y	Y	Y	0	Y	N	N			0	0	Wash,D.C.
NIGHT OWL	(312)459-5721	8,1,N	24Hrs		Y	N	Y	Y	N	1	Y	Y	Y		7 MB	150 KB	0	Chicago, Illinois
OMNI-NET	(718)837-2881	8,1,N	24Hrs		N		Y			1	Y	N	N			0	0	New York
OWEGO FREE ACADEMY	(607)754-3420	8,1,N	24Hrs		N	Y	Y	Y		0	Y	Y					0	Owego, New York
PLINK			24Hrs				Y	Y	Y	1	Y	N	N			0	0	
SERIAL PORT	(313)286-0145	8,1,0	24Hrs		N	N	Y	Y	Y	1	Y	Y			15 MB	70 KB		Ann Arbor, Michigan
SOURCE	(Telenet)	7,1,0	24Hrs			N	Y	Y	Y	0	Y	N	N			0	0	McLean, Virginia
STARTEXT	(817)877-1041	8,1,N	24Hrs			N	Y	Y	N	0	Y	Y	N					Ft.Worth, Texas
TIMEXCHANGE	(213)329-3922	8,1,0	24Hrs		Y	Y	Y	Y	N	1	N	Y	Y		25 MB	900 KB	20 MB	Los Angeles, California
TSU	(216)327-1099	7,1,1	24Hrs		N	N	Y	Y	N	5	Y	Y	Y		800 KB	100 KB	0	Cleveland, Ohio
VSYS	(201)527-0535	7,1,N	*		Y	N	Y	N	N	4	N	N	N			0	0	Elizabeth, New Jersey
ZEBRA SYSTEMS	(718)625-6220	8,1,N	24Hrs		N	N	Y		N	8	Y							Woodhaven New York

QL Pascal Development Kit
by Metacomco

This is a big package that comes in a big package. From the moment you see the package, it looks like it's well worth the price you've paid for it.

The package contains two tapes, a ROM cartridge, a well written user's manual, and a plastic "book" that is so typical of QL packages. Tape A is the compiler, with tape B having the screen editor and linker on it.

The user's manual is a fully bound book. In it is information on how to use the system, the screen editor, and a detailed look into Pascal syntax. The manual is not written as a learning aid for new Pascal programmers, but as a reference for Pascal. The book also lists the extensions to regular Pascal that have been added to take advantage of the features of the QL.

The screen editor is great. It is easy to use. Most of the editing commands are a combination of the arrow keys and the shift, alt, and control keys. Block commands and the such are entered by a command line called up by the F3 key.

One feature that I like about the editor, is its ability to use the QLs' built in feature of multi-tasking. The editor can be EXECed more that once so that you can edit more than one file at a time.

The only problem that I have found with the system, is that the compiler is kind of slow. It takes a couple of minutes to load the compiler in. Then it takes a couple of minutes to compile the program. This is definitly not Turbo Pascal, but they never said it was.

Even with the speed problem, this system gives QL users access to a language that is used almost universaly by most computers. I have been using it in my Data Structures class. Most of the Texts on data structures have the algoritms in Pascal.

It also gives the user a very fast program with out the need and problems of going to Assembly.

```
10 REM ** DEMONSTRATION  OF  **
     **   USING  "OVER"   **
     ** TO DO UNDERLINING **
20 REM
25 REM ****** EXAMPLE 1 ******
30 PRINT AT 1,0;"NAME";TAB 9;"
ADDRESS";TAB 20;"CITY & STATE"
40 PRINT AT 1,0;; OVER 1;"____
____";TAB 9;"_____";TAB 20;"_
_____"
50 REM
55 REM ****** EXAMPLE 2 ******
60 PRINT AT 18,0;"THIS IS THE
TIMELINEZ NEWSLETTER"
70 PRINT AT 18,12; OVER 1;"___
___"
80 REM
90 REM **** T S U N A M I ****
```

TOTALLY SAFE MACHINE CODE FOR THE ZX81 AND TS1000

Rather than starting by beating a dead horse, the answer will precede the explanation.

Here are two templates:

```
   1 REM .........1.........2...
.....3.........4.........5.....
....6.........7.........8.....
..9.........A.......  /■
   2 REM .........1.........2...
.....3.........4.........5.....
....6.........7.........8.....
..9.........A.........B.......
  /■
```

Template #1 provides 112 bytes of machine code space.
When more than 112 bytes are needed, template #2 is added.
Template #2 provides 122 bytes of machine code space.
When still more space is needed, template #2 is copied to line #3 etc., as many times as you like.

Program memory begins at 16509. The following chart shows the memory addresses where the templates are stored. The addresses ***** are especially important.
Your machine code can be POKEd into the text area of any template, with one (but important) restriction.

NOWHERE in your machine code can CHR$(118)="ENTER" appear! The computer will interpret it as the end of the REM statement, with disastrous results.

FORMAT	1 REM	2 REM	3 REM	4 REM	5 REM	...
MSB LINE #	16509	16627	16755	16883	17011	...
LSB LINE #	16510	16628	16756	16884	17012	...
LSB LENGTH-4	16511	16629	16757	16885	17013	...
MSB LENGTH-4	16512	16630	*****	16886	*****	...
CHR$(234)="REM"	16513	16631	16759	16887	17015	...
START OF TEXT	16514	16632	16760	16888	17016	...
...	...	...	...	...	...	...
END OF TEXT	16625	16753	16881	17009	17137	...
CHR$(118)="ENTER"	16626	16754	16882	17010	17138	...
TEXT BYTES	112	122	122	122	122	

Avoiding CHR$(118) in your machine code is always possible, but there are sneaky ways it can get there without you being aware of it. Either byte of a two byte CALL or JP address might accidentally be CHR$(118). The first sneaky addresses in RAM are 16502, 16758, 17014, 17270, etc. by increments of 256 bytes.

Ah hah! The templates hide these under *****, so you do not have to worry about them. Don't stop worrying yet, though.

There are two more cases which require caution.

The first is another sneaky one, but simple to avoid.
Never use JR __,+120 . Use JR __,+121 and add a NOP instead.

The other case is obvious, but harder to fix. LD __,118 and CP 118 cannot be used.
For LD __,118 , use LD __,117 : INC __ .
For CP 118 , use CPL : CP 37 : CPL

In brief, never use:
```
   JR __,+120 ,
   LD __,118 , or
   CP 118 .
```

The result is perfectly safe machine code which can be edited, added to, and saved to tape. (All right, you experts, you can't use I/O device (N)=118 , and you better use (HL) when addressing ROM routines.)

HEY! It works! Forget that dead horse.

The wierd doodad at the end of the templates is simply three NOPs followed by JR +6 . It comes in handy when your code runs into the next template.

One last hint--keep a spare copy of both templates.

C 1985 William J. Pedersen

TIMEX 2068 demo

```
#    val    %
1    74.6   10
2    91.7   13
3    90.1   13
4    45.8    6
5    82.5   11
6    38.5    5
7    63.5    9
8    18.1    3
9    55.4    8
10   10.1    1
11   86.3   12
12   63.5    9
     720.1
```


PIE CHART PROGRAM

BY FRED TEMPLETON (EBZUG)

This program will display a pie chart and the values for each of up to 18 pieces of the pie. If more than 18 pieces of the pie are entered then the %'s column will not line up with the values entered due to scrolling. The PLOTing routine is placed at the beginning of the program for speed. Depending on the pie slice densities, typical PLOTing time can run between 2 and 15 minutes.
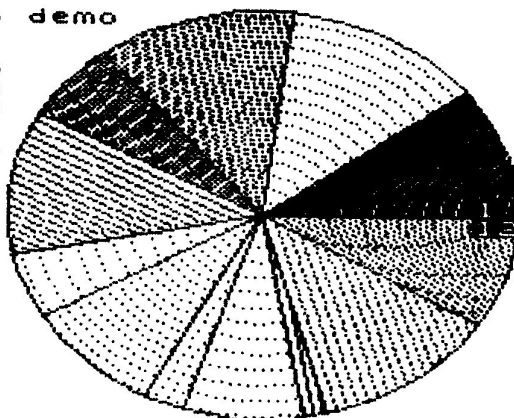
```
   1 RUN 400: REM FOR PIE CHART WITH UP TO 18 PIECES OF PIE
 240 FOR r=1 TO ra STEP  RND *6+.7: FOR p=as TO ae STEP d*(40/r): PLOT r* COS p+xc,r* SIN p+yc: NEXT p: NEXT r: RETURN
 400 INPUT "PIE CHART NAME? ";N$: CLS : PRINT N$''"#  val  %": INPUT "how many divisions? ";div
 401 LET total=0: DIM d(div)
 402 FOR a=1 TO div: INPUT "enter value for division #";(a);" ";d(a): LET total=total+d(a): PRINT a; TAB 3;d(a): NEXT a
1100 LET xc=168: LET yc=88: LET ra=87: CIRCLE xc,yc,ra
1200 LET ang=0: FOR s=1 TO div
1400 PRINT  AT s+2,8; INT (d(s)/total*100+.5)
2050 LET d=( RND *6+.7)*.01745
2200 LET as=ang*.01745
2210 PLOT xc,yc: DRAW ra* COS as,ra* SIN as
2222 LET ang=ang+d(s)/total*360
2300 LET ae=ang*.01745
2400 GO SUB 240
2440 NEXT s
3000 PRINT  TAB 2;total; AT 10,30; INVERSE 1;1; AT 11,30;div
3333 STOP
9999 SAVE "pie chart"
```

SOFTWARE REVIEW: by Joan Kealy

Software Review of "Musician Royal" by Oleg Jefimenko, available from Electret Scientific Co., P.O. Box 4132, Star City, WV 25505. $29 for full cassette program and 74 p. manual including complete index. Demo available for $3 to be applied to full purchase price if full program subsequently ordered.

    This program is available for TS2068 and IBM PC. Interestingly, this program was written first for the TS2068, enabling Dr. Jefimenko to write his book, 30 Music Programs For the Timex Sinclair 2068, a best-seller per E. Arthur Brown Co. A few short months ago he published his "Musician Royal" so others could transcribe their own choice of selections into one of 3 forms--a "Music Box Collection", a "Music Album", or a SAVE for independent playing. To me among the most useful features is the ability to change the music's pitch or tempo to an arrangement more personally pleasing. The manual is an additional asset because, in the process of learning transcription, one will naturally learn a great deal about music notation. But you need know NONE to transcribe songs from sheet music to computer because the program will, for instance, determine the correct key when number of sharps or flats are input. There are correction opportunities aplenty including a printout to TS2040 for easy-find on errors.

    The author has explained why he chose to use BEEP rather than SOUND channels:"due to the limited memory of TS 2068, the effective note capacity of the program would be smaller (only about 400 melody notes), so that only very short compositions could be transcribed with it." In fact, my favorite tune on the Demo, "Tico Tico", could not have been transcribed because it has 934 notes. As written, "Musician Royal" can hold all the repeats necessary for "da capo al fine" so the music can be played exactly as written--not just snatches of melody. There's room for changes of tempo and key within the composition.

    If the present program does well, Jefimenko plans to release a supplement to present manual and a second cassette with a four-channel version. If you pine for one-voice melody and three voice harmony, you'll have to settle for a max of 400 melody notes. I wish there was a TS 2068 disk version; IBM program comes on disk. I had zero luck trying to transfer the program to my Timex Portugal disk system but perhaps the author will help. He is an obliging correspondent who has answered other questions.

    Though working through the manual is not difficult because of careful explanations, for me dealing with musical notation is sufficiently difficult for openers that I am glad I am not trying to cope with four channels immediately; however, I went back to 30 Music Programs for Timex Sinclair 2068 and worked on the third "Music Box" with "Prelude" by Chopin in 4 channels. I must say, it's a difficult swapout: 400 notes in four voices or 1500 in one channel. The harmony was so much prettier than a single voice that I'd like the 4 channel sequel for those short pieces that would fit into 400-note slot. Add a small amplifier and a 4-part arrangement-- TS 2068 becomes a musical instrument.

    Frankly, I hope sale of "Musician Royal" justifies the supplement because I think entering all those DATA statements by hand for 4 channel versions is tedious as waxing a ballroom with one honeybee.

EBZUG NEWS
BY FRED TEMPLETON

REPORT ON MEETING OF NOVEMBER 20th.

Meeting was called to order shortly after
8:00PM by Joeseph Randall. The meeting was
started by everybody identifing themselves
and there current interests and/or
projects. Regular members in attendence
were Ivor Alma, Russell English, John
Ezike, Tom Fattaruso, Fred James, Alvin
Lam, Woody McPheeters, Bill Miller, Joseph
Randall, Wayne Seibel, Fred Templeton,
Darwin Thompson, and Kevin Zimmerman. In
addition Erwin Mead from GUTS visisted us,
and we welcomed two new members MATT MOORE
and DANIEL L. MOORE (not related)

Darwin Thompson informed us that the QL has
been selling for as low as 199.00 at A+
Computer Response 69-B Island St. Keene, NH
03431 (603) 357-1800. He reported that
they can help with almost any added option
to configure a system to anyones needs. It
is unknow if Sunset Electronics is matching
the price. It seems the price decline is
due to an upcomming change in the QL's
distribution network.

Russell English brought to our attention
that most parts for the 2068 are available
at most electronics stores except the SCLD
chip which is custom to the 2068. There is
a souce and he reported that the group
could join the other user groups to
purchase some. A vote was taken to
purchase one for our general inventory,
which did not pass. It was suggested that
those who are interested put up the cash
and share the risk. Price 1-$25.00 3 or
more $18.00.

One of the main events of the night's
meeting was a video of the TIMEX/SINCLAIR
Computer Fest in Cincinatti, Ohio this May
'86. The video was as exciting as watching
the opening of Al Capone's undergound
vault--empty. The entire 15 minute feature
was a constant paning view of the people
there without a single feature or
interview. At least we did get to see some
of the exhibitors displays. Although the
video was limited it did show that there
were plenty of people there.

I got a chance to show off my 2068
word-processor with multi-tasking abilities
but I blew it when I POKED the wrong
address into the vector table and caused
the printer output to get scrambled and
ultimately to crash the whole system.
Fortunately I printed out the beginning of
this article on the 2040 printer (while the
EPSON printer was printing something else)
before the crash.

PUG NEWS
BY GEORGE MOCKRIDGE

JACK DOHANY HAS WRITTEN THE DEFINITIVE RLE PROGRAM FOR THE
TS-2068. HIS MC VERSION NOT ONLY INSTANTLY DECODES PICTURE
FILES...IT ALSO CREATES AN RLE FILE FROM A PICTURE THAT YOU
SUPPLY.

THOSE PEOPLE WITH AN AERCO DRIVE CAN NOW PURCHASE SOFTWARE
ON 5.25" DISKS. CONTACT: CHIA-CHI CHAO, 73 SULLIVAN DRIVE,
MORAGA, CALIFORNIA 94556.

MORE THAN SINCLAIR COMPUTERS HAVE BEEN ON DISPLAY AT THE
LAST COUPLE OF PUG MEETINGS. TERRY GREENLEE SHOWED OFF
HIS NEW TOSHIBA PORTABLE AND MALCOLM McAFEE DEMONSTRATED
HIS AMSTRAD CPM-WORD PROCESSING COMPUTER. COME TO A MEET-
ING...YOU NEVER KNOW WHAT YOU'LL SEE.

SVSTUG NEWS
BY BILL MILLER

1 Upcoming Meetings at El Camino Hospital, Meeting Room A (in
  Basement), 2500 Grant Road, Mountain View, at 7:00 P.M.:
December 30, Tuesday
January 27, Tuesday
February ??, ???????, No meeting place scheduled yet, if we
  can't find a place, we will meet with PUG at Peninsula
  Hospital in Burlingame on the 3rd Sunday of the month?
2 New meeting places:
While we are scheduling a new meeting place, we have an
  opportunity to decide if some other night would be more
  convenient for some members. If you have preferences,
  contact Bill Miller.
The Timex Sinclair Special Interest Group of The Computer
  Workshop meets every Saturday morning at 9:00 A.M. at
  Stanford University Jordan Hall (in the Quadrangle), Math
  Building (Number 380) in Room 380C (downstairs). For topic,
  check the PDSE (Public Domain Software Exchange) BBS in
  Sunnyvale at 408 735-7390, 300/1200, 8, N, 1, 24 HRS.
3 BBS News:
Mark Wahl reported at the 861126 GUTS/SV (SVSTUG?) meeting
  that he is writing a BBS for the TS1000 which will be able
  to use the A&J TS1000 Microdrive, User Friendly Research
  Real Time Clock Board, Hunter 8K Non-volital SRAM/ EPROM
  Board, & Byte Back 64K UM-64 DRAM Board.
The 861204 'The Guide to T/S Telecommunications' from Steve
  Ishii reports Richard Kelsch is running 'The Looney Bin!'
  BBS in San Diego (619 390-9470, 300, 7, 1, 0, 24 HRS) using
  A TS2068, An A&J Microdrive, & A 512K RAM Drive!
Local Commodore 128 BBS's have offered thier systems for
  TS Message Bases:
Steve Nichols, Cupertino BBS 408 253-2295, 300/1200, 8, N,
  1, 24 HRS. Steve reports he has written several TS1000
  programs which he would be glad to donate to the User
  Group. They are all for 16K and include: Mailing Label,
  Invoice, & Speeds & Ratios, + several others. For more
  information, leave a message on Steve's BBS.
Ron Pierce, Milpitas BBS 408 262-3963, ???, ?, ?, ?, ?? HRS.
861206.1451;SL;142

###
IT NEVER RAINS BUT IT POURS! A LOT OF ARTICLES WERE RECEIVED
FOR THIS ISSUE OF TIMELINEZ.   THUS...THE 12 PAGES.   KEEP UP
THE GOOD WORK!!!
###

* * * * * * * * *

COMPUTER CALENDAR

* * * * * * * *

J A N U A R Y   1 9 8 7
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3   COMPUTER SWAP MEET   10am-5pm
     San Mateo Fairgrounds $5

18   PENINSULA USER GROUP   1:00
     Peninsula User Group
     1783 El Camino Real
     Burlingame

22   EAST BAY USER GROUP   7:30
     West Branch Library
     1125 University Avenue
     Berkelely

27   SILICON VALLEY USER GROUP 7:00
     El Camino Hospital
     Meeting Room A (in basement)
     2500 Grant Road, Mountain View

F E B R U A R Y
---

15   PENINSULA USER GROUP   1:00

26   EAST BAY USER GROUP   7:30

??   SILICON VALLEY USER GROUP
     (Date to be Determined)

* * * * * * * * *

COMPUTER HOTLINE
    KSTS, Channel 48   Tuesdays, 6:00

THE COMPUTER SHOW
    KTSF, Channel 26   Tuesdays, 7:00

COMPUTER CHRONCILES
    KQEC, Channel 32   Tuesdays 7:30
    KCSM, Channel 60   Fridays 9:00

* * * * * * * * *

E B Z U G   EAST BAY Z80 USER GROUP
=========   3128 KING STREET
          BERKELEY, CALIFORNIA 94703
            (Woody McPheeter's)

  CONTACT: RUSS ENGLISH, (415) 465-3116

  MEETINGS: FOURTH THURSDAY OF EACH MONTH, 7:30 P.M.
            WEST BRANCH LIBRARY
            1125 UNIVERSITY AVENUE, BERKELEY

MAKE CHECK FOR DUES PAYABLE TO "WOODY McPHEETERS".

P U G   PENINSULA USER GROUP
=====   311 MICHELLE LANE
        DALY CITY, CALIFORNIA 94015
        (415) 878-1773

PRESIDENT: GEORGE MOCKRIDGE

  MEETINGS: THIRD SUNDAY OF EACH MONTH, 1:00 P.M.
            PENINSULA HOSPITAL
            1783 EL CAMINO REAL, BURLINGAME

MAIL DUES TO "PAT MORRISSEY", 2000 CRYSTAL SPRINGS ROAD,
           BLDG 21, APT 22, SAN BRUNO, CA 94066

S V S T U G   SILICON VALLEY SINCLAIR TECHNOLOGY USER GROUP
===========   6675 CLIFFORD DRIVE
            CUPERTINO, CALIFORNIA 95014
            (408) 253-3175

PRESIDENT: RITA CARR, (408) 738-2888, X-4579

  MEETINGS: LAST TUESDAY OF EACH MONTH, 7:00 P.M.
            (FOR LOCATION OF MEETINGS, SEE ACCOMPANYING
            CALENDAR AND SVSTUG NEWS.)

MAKE CHECK FOR DUES PAYABLE TO "SINCLINK".

THIS TIMELINEZ NEWSLETTER IS A JOINT PUBLICATION OF THE THREE
TIMEX-SINCLAIR USER GROUPS IN THE SAN FRANCISCO BAY AREA.

NEW MEMBERS AND VISITORS ARE ALWAYS WELCOME.

FOR FULL MEMBERSHIP (WHICH INCLUDES PARTICIPATION IN GROUP
MEETINGS, THE TIMELINEZ NEWSLETTER, TAPE LIBRARY PRIVILEGES,
AND SPECIAL EVENTS), SEND $15 ANNUAL DUES TO ONE OF THE ABOVE
ADDRESSES WITH THE CHECK MADE PAYABLE AS INDICATED.

FOR JUST AN ANNUAL SUBSCRIPTION TO THE NEWSLETTER, SEND A $10
CHECK TO ONE OF THE ABOVE GROUPS.

→ by William J. Pedersen ←

There have been quite a few articles written recently on the CENTRONICS interface. While there is some difference in printer design, only one variation is of any significance. Some printer designs provide RESET as a separate connector pin. Others use the ASCII escape code.

The routine shown below applies to all printers operating with a Z80 PIO interface having the STB pin connected to one of the status port bits.

Bank#255 Group:UIDJUP Routine:PIO #2

```
61594   08        EX AF,AF'              !Save character
61595   DB80      IN A,(N)        128    !Get Status
61597   E610      AND N           16     !Mask BUSY bit
61599   200C      JR NZ,+14       61613  !If BUSY
61601   08        EX AF,AF'              !Here if NOT BUSY\Get A
61602   D382      OUT (N),A       130    !Send char
61604   AF        XOR A                  !Zero REG A
61605   F3        DI                     !Block keyboard interrupt
61606   D380      OUT (N),A       128    !Drive STB low.
61608   2F        CPL                    !Set REG A to 255
61609   D380      OUT (N),A       128    !Restore STB high.
61611   FB        EI                     !Restore interrupts
61612   C9        RET                    !Get next char
61613   CD0920    CALL NN         8201   !BREAK?
61616   38E9      JR C,-21        61595  !Loop until NOT BUSY
61618   CF        RST 8           8      !Error exit
61619   0C        DC              12     !BREAK error message.
```

NOTE #1: If printer is not turned on, data is lost.
NOTE #2: Printer will lock up if STB is active when ACK rtrnd
NOTE #3: Port addresses should be for your interface
NOTE #4: Status bit assignments should be for your interface

This routine will never cause a printer to lock up. The time taken by the 2068 to process a keyboard interrupt is often more than 150 microseconds. If this interrupt was permitted while STB was low, the ACK signal could arrive from the printer before STB went high again.
In this routine, interrupts are blocked while the STB pulse is being sent.

For those not familiar with STB and ACK, the STB is a signal to the printer that valid data is present on the data wires. The ACK is an acknowledgement signal from the printer that the data has been received, and other things are normal.
Both signals are pulses having the timing shown in Figure 1.

The ACK pulse can be as short as 4 microseconds. A 2068 code loop to test if it is there takes longer than that. Part of the time the signal will be missed. That is why the BUSY signal is tested instead. The reason for the ACK signal is to generate an interrupt when that operating mode is in use. The Z80 PIO can be configured that way but the 2068 does not operate in IM2 as a general rule. (Vectored interrupt mode)

When things are not normal, like running out of paper, or the printer cover is open, the program keeps looping. In order to break out of this loop, use is made of the ROM subroutine BREAK? at address 8201. Usually, this is sufficient because printers indicate when they are at FAULT with an alarm and/or light. If not, you might want to test the printer status after calling the BREAK? routine. This is like gilding a lily, though.
BREAK? is a short routine which senses if both the CAPS SHIFT and BREAK keys are pressed. It does not wait for the keyboard interrupt.
Not even one character is lost when breaking in. CONT takes up where it left off. This lets you take care of the printer if necessary, or to enter immediate instructions.

CENTRONICS TIMING
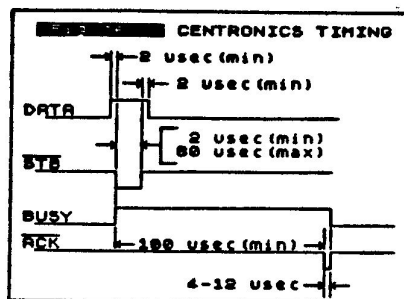
A printer needs two routines to bring it on line. The first is to configure the Z80 PIO interface so it will properly talk to the printer. The second is the equivalent of OPEN #3,"C".
There are six items of information you must provide. You can arrange for these to be default values if you want. For this article they are variables C1 through C6. The parameters they represent are:

C1 = TO PRINTER PORT ADDRESS
C2 = ABOVE COMMAND REGISTER ADDRESS
C3 = STATUS/STB PORT ADDRESS
C4 = ABOVE COMMAND REGISTER ADDRESS
C5 = BUSY BIT VALUE
C6 = STB BIT VALUE

The following statements accomplish the initialization.

```
599 RESTORE 600
600 DATA 8,219,C3,230,C5,32,12,
8,211,C1,175,243,211,C3,47,211,C
3,251,201,205,9,32,56,-23,207,12
601 FOR N=61594 TO 61619          ! Or relocate to suit
602 READ PARM:POKE N,PARM
603 NEXT N
604 OUT C2,255:OUT C2,255:OUT C
2,7
605 OUT C4,255:OUT C4,255-C6:OU
T C4,7
```

The equivalent of OPEN #3,"C" is:

```
610 POKE 26703,154:POKE 26704,2
40:RETURN
```

The equivalent of CLOSE #3 is:
(CLOSE #3 works too.)

```
620 POKE 26703,PEEK 26693:POKE
26704,PEEK 26694:RETURN
```

The CLOSE #3 returns control to the 2040 printer.

The OPEN #3,"C" enables LPRINT to the printer, but if you want COPY and LLIST to work, a lot more machine code is needed. This is because both use tokens and control codes the printer cannot understand.

If your printer is one of those with a wired RESET, you must reconfigure the PIO to address that bit, then restore the working configuration after the reset is completed.

One other problem can be encountered. Printers with graphics capability will not respond to commands until they have been fed all graphic data. This is most easily solved by sending a long string of CHR$0 (NOP's before issuing commands. This will fill the graphics buffer and the extra NOPs will be ignored.

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USA 17